

# Text-to-image Diffusion Models in Generative AI: A Survey

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## Abstract

This survey reviews the progress of diffusion models in generating images from text, *i.e.* text-to-image diffusion models. As a self-contained work, this survey starts with a brief introduction of how diffusion models work for image synthesis, followed by the background for text-conditioned image synthesis. Based on that, we present an organized review of pioneering methods and their improvements on text-to-image generation. We further summarize applications beyond image generation, such as text-guided generation for various modalities like videos, and text-guided image editing. Beyond the progress made so far, we discuss existing challenges and promising future directions.